Statement for the Record

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Introduction

Good afternoon, Chairman Linder, Ranking Member Langevin and Members of the Subcommittee. I appreciate the invitation to meet with you today to discuss the significant role of science and technology in bringing to bear solutions to the challenges the Department of Homeland Security (DHS) and the Nation face in making us all more secure. Specifically I will address the realignment of the Directorate to better meet the mission needs of our customers – the DHS Components, and the customers of our customers - the first responders; the work of the Homeland Security Research Enterprise including the DOE National Labs; and the progress we've made in one of the biggest DHS priorities, biological defense.

President Bush noted the important role of science and technology in protecting the Nation in July of 2002 when he discussed the creation of the Department of Homeland Security: "We will harness our science and our technology in a way to protect the American people. We will consolidate most federally funded homeland security research and development, to avoid duplication, and to make sure all the efforts are focused."

The Science &Technology Directorate (S&T Directorate)'s mission is to protect the homeland by providing Federal, State, local, and Tribal officials with state-of-the-art technology and resources. To accomplish this mission and be successful we have made changes to mature the organization. My goal for the Directorate, as envisioned by our enabling legislation, is to become a full service organization that is customer focused and output oriented. It must also be cost effective, efficient, responsive, agile, and flexible.

It is essential that the Nation invest strategically in research and development to detect and prevent a nuclear or biological incident and to minimize the consequences should such an event occur. This requires the S&T Directorate to focus research on areas that will best fill our customer's capability gaps and improve operations. We must set our priorities to align with National and Department of Homeland Security priorities.

Setting Priorities

My years at the Office of Naval Research taught me that a research and development (R&D) organization must take to heart customers' insights, priorities, and goals. Since my arrival at DHS on August 10, I have identified a number of strategic changes that are required to transform the Directorate into a world class science and technology management organization that is adept in mobilizing the resources of the Nation's and the world's vast R&D enterprise to address gaps and vulnerabilities in homeland security.

When Secretary Chertoff launched a Second Stage Review of Department operations last year, he emphasized the need for the Department to focus on risk. "We cannot protect every single person against every single threat at every moment and in every place. We have to, with our finite resources and our finite employees, be able to focus ourselves on those priorities which most demand our attention. And that means we have to focus on risk. And what does that mean? It means we look at threat, we look at vulnerability, and we look at consequence." The S&T Directorate will endeavor to fulfill the threat-based needs of our customers and focus on enhancing the ability to reduce risk throughout the Department.

To quickly capture and articulate these broad risk based priorities, I internally refer to them as the "4 B's":

- Bombs
- Borders
- Bugs, and
- Business

S&T will work with our customers to sharpen the focus of our research and enhance our customers' capabilities in these core areas to better secure our nation.

The R&D Budget Priorities issued annually by the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB) help guide the S&T

Directorate's planning efforts. The budget priorities for FY 2008, issued in June 2006, acknowledge the far-reaching response of the nation's science and technology enterprise as called for in the President's National Strategy for Homeland Security for the development of "new technologies for analysis, information sharing, detection of attacks, and countering chemical, biological, radiological and nuclear weapons."

The OSTP/OMB budget priorities acknowledge the significant number of achievements over the past four years, as well as the many challenges to reducing the nation's vulnerabilities to high-consequence events that remain. Among the areas cited as being in need of increased emphasis, are several in the biodefense arena that S&T with our interagency partners is actively addressing. These include:

- Quick and cost-effective sampling and decontamination methodologies and tools for remediation of biological and chemical incidents
- The development of integrated predictive modeling capability for emerging or intentionally released infectious diseases of plants, animals and humans, as well as for chemical, radiological or nuclear incidents, and the collection of data to support these models
- The exploitation of recent advances in biotechnology to develop novel detection systems and broad spectrum treatments to counter the threat of engineered biological weapons
- The development of novel countermeasures against the natural or intentional introduction of agricultural threats, including R&D on new methods for detection, prevention and characterization of high-consequence agents in the food and water supply.

S&T will focus on the customers' risk based priorities and capability gaps. In order to effectively implement these research priorities, the S&T Directorate is organized to be more accessible by the DHS Components to leverage the value added work the men and women of S&T are bringing to the fight. Our DHS customers utilize technologies and solutions that will make their jobs better, more efficient, more cost effective, and safer.

Implementing R&D Priorities

Toward this end, S&T will utilize customer-led Integrated Products Teams (IPT). DHS Management will lend acquisition expertise and guidance to this effort. DHS R&D program requirements will be reviewed at least annually and IPTs will be tasked with formulating specific goals and budgets. These teams will be chaired by the DHS customers who need new technology to improve their performance in achieving their mission. Test and Evaluation functions will be integral to the IPT process to help ensure that the products and capabilities delivered meet customer and first responder needs.

Six Disciplines - the S&T Divisions

The S&T Directorate is now organized in six Divisions along disciplines that are aligned with our customers' requirements. Each Division has at least one Section Director of Research and a Section Director of Transition. The Section Director of Research works with S&T's Director of Research and is focused on basic research; and coordinates with the National Laboratories and S&T's University Programs, including the Centers of Excellence. The Section Directors of Transition work with S&T's Director of Transition and focus efforts on applications and expediting technology transition.

The disciplines and examples of programs in each Division are:

- Energetics – i.e. Aviation Security; Mass Transit Security; Counter MANPADS
- Chemical/Biological – i.e. Chem/Bio Countermeasure R&D; Threat Characterization; Agro-Defense; Bio-surveillance, Response & Recovery
- C4ISR — i.e. Information management; Intelligence/Information Sharing; Situational Awareness (e.g., interoperability and compatibility; security screening; cyber security)
- Borders/Maritime – i.e. Land Borders; Maritime/U.S. Coast Guard; Cargo
- Human Factors – i.e. Social-Behavioral-Terrorist Intent, Human Incident Response, Biometrics

- Infrastructure/Geophysical Science – i.e. Critical Infrastructure Protection; Regional, State and Local Preparedness and Response; Geophysics

Additionally, the Director of Innovation (Homeland Security Advanced Research Projects Agency (HSARPA) works with the leaders of each Division and, as specified in the Homeland Security Act of 2002, "support(s) basic and applied homeland security research to promote revolutionary changes in technologies; advance the development, testing and evaluation, and deployment of critical homeland security technologies; and accelerate the prototyping and deployment of technologies that would address homeland security vulnerabilities."

The S&T Directorate will align its investment portfolio to balance project risk, cost, impact, and the time required to deliver results. Investments span across three technology Transition Readiness Levels: Short-term R&D projects of less than three years; mid-term projects of three to eight years; and long-term efforts that extend beyond eight years. Our investment portfolio must be prioritized across long-term research, product transition and leap-ahead capabilities. A healthy push and pull between the research and application arms of the organization, coupled with tension over mid-term resources, will help S&T achieve a balanced investment portfolio.

To execute these priorities the S&T Directorate has resources across public sector, private sector and academia; I refer to this as the Homeland Security Research Enterprise. Thanks to the enabling legislation, we have the ability to utilize DHS labs, Department of Energy's National Labs, Homeland Security Institute and the DHS Centers of Excellence. Additionally we utilize other agencies' resources including those of Department of Defense (DoD); National Institute of Standards and Technology; Health and Human Services; Department of Agriculture; Environmental Protection Agency; National Science Foundation; DoD Federally Funded Research & Development Centers; industry; international partners; and stakeholder associations. This allows the Directorate to select the best performer based on capabilities.

DHS Use of DOE National Laboratories

We have a strong working relationship with the DOE National Labs and I thank you for enabling the Directorate to utilize these important national assets. For more than half a century, the Federal Government has invested tens of billions of dollars in creating the Department of Energy's (DOE) National Laboratory system. Today these Laboratories represent state-of-the-art scientific capabilities that support the development of innovative technologies to address evolving national needs. For this reason, the Homeland Security Act of 2002 gave DHS special access to the National Labs. It created the Office of National Laboratories (ONL) within the S&T Directorate and gave it responsibility for coordinating and utilizing these unique national assets in support of the DHS mission.

ONL, with the active collaboration of DOE, is working to continually improve the utilization of this enormous national resource by enabling DHS to harvest the full range of National Laboratory science and technology innovations.

Many homeland security programs that were conducted by the National Labs prior to 9/11 were transferred to DHS at its inception and have since formed a solid core of technical competence for S&T. With the active support of DOE, the S&T Directorate continues to use the National Labs, building upon their unique capabilities, vast experience, and past performance in specific areas vital to homeland security.

The relevant technical capabilities of all of the National Laboratories are used to support S&T and its DHS customers in identifying technical goals and the specific science and technology innovations needed to satisfy those goals. The ONL coordinates efforts to identify and organize multi-laboratory R&D teams that represent the most qualified technical experts to ensure the most efficient allocation of the National Lab capabilities and resources to help achieve the goals of DHS customers.

Following DOE review and acceptance, the selected multi-lab teams will execute the National Lab programs under DOE management and supervision.

ONL coordinates annual reviews of National Laboratory performance using teams of DHS customers, S&T Directorate Program Managers and independent technical experts. These reviews evaluate R&D performance based on three primary criteria: mission and DHS customer relevance; technical competency; and management effectiveness. Since many DHS R&D programs are of multi-year duration, the above process will be used to manage program execution as well as to initiate new programs. ONL will also support the DOE in its laboratory strategic planning and annual reviews of performance to maintain enduring national capabilities that support both the DHS and DOE missions.

One of the Department's biggest priorities is detecting, preventing and responding to a biological attack, or "Bugs" in my shorthand. As you are aware, the deliberate or accidental release of a biological threat agent has the potential for disastrous consequences that include mass casualties. The economic impact of biological event could significantly disrupt the nation's critical infrastructures and the functioning of our society.

Biodefense: The S&T Biological Countermeasures Program

The DHS S&T Biological Countermeasures program provides the understanding, technologies and systems needed to protect against possible biological attacks on the nation's population, agriculture or infrastructure. The program places its greatest emphasis on those biological attacks that have the greatest potential for widespread catastrophic damage. These include aerosolized anthrax, smallpox, highly virulent agricultural scourges such as foot and mouth disease, and contamination of selected food supplies. Where appropriate, the program incorporates biodefense as part of an integrated chemical, biological, radiological, nuclear and explosive (CBRNE) defense across civil and military agencies.

The program's core requirements derive from the President's *Biodefense Strategy for the 21st Century* Homeland Security Presidential Directive (HSPD-10), which provides a comprehensive framework for our nation's biodefense, and *Defense of the U.S. Agriculture and Food* (HSPD-9), which establishes a national policy to defend the Nation's agriculture and food systems against terrorist attacks, major disasters, and other emergencies. Programs are formulated to respond to each of the 11 specific taskings in these HSPDs for which DHS S&T has a lead or major role. In addition, the composition, priorities, and goals of the overall portfolio and of each major program area are reviewed and approved or altered annually as part of S&T's formal five-year RDT&E planning process.

Current lead or major roles of S&T's Biological Countermeasures program include:

- Conducting periodic risk and policy net assessments to guide the overall biodefense program;
- Establishing the National Biodefense Analysis and Countermeasures Center (NBACC) to conduct the laboratory experiments needed to close key knowledge gaps in understanding the risks posed by current threats and to develop strategies for defending against future threats;
- Working with the Department of Health and Human Services (HHS) to develop countermeasures to biological threats;
- Leading the coordination of a national-attack warning system,
- Expanding BioWatch, a monitoring program designed to provide cities with the earliest possible warning of an aerosolized attack;
- Developing bio-detection systems for critical infrastructures;
- Developing detection systems for protecting the food supply;
- Establishing the National Bioforensic Analysis Center as the Nation's lead facility for technical analysis of samples from potential biocrimes or acts of bioterrorism to support attribution by the appropriate Federal agencies;

- Operating and upgrading the Plum Island Animal Disease Center, the only facility in the U.S. dedicated to studying certain foreign animal diseases such as Foot and Mouth Disease; and
- Working jointly with the U.S. Department of Agriculture (USDA) to expand current and new agricultural countermeasures, and develop a plan for safe, secure, state-of-the-art biocontainment laboratories for foreign and zoonotic diseases.

These activities are coordinated at the Federal level through a variety of mechanisms, most notably through the Homeland Security Council, several subcommittees under the National Science and Technology Council and the Office of Science and Technology Policy, and through direct coordination with specific departments.

The overall guiding principle has been to allocate work to the private or academic sectors, whenever possible, and only assign work to national or Federal laboratories that:

- is inherently governmental or quasi-governmental;
- involves selected core competencies;
- does not provide sufficient financial incentive to attract industry involvement;

The vast majority of work that is performed in the private or academic sector goes through normal competitive processes that range from Requests for Proposals to Broad Agency Announcements (BAA) with source selection based on programmatic review.

For work to be performed at the National Laboratories, the Office of Research and Development Program Manager, working with the designated Thrust Area coordinator, decides which laboratory should perform the work based on internal proposals and knowledge of the relative strengths of each laboratory.

Applying these guidelines has resulted in the following major roles for each of these entities:

- **DOE National Laboratories:** building on their strong computational capabilities and role in the intelligence community, the National Labs have established and operate the Biodefense Knowledge Center; continue to provide technical reachback support for the BioWatch monitoring system which they piloted; and continue to play a major role in assay development for the highly specific recognition of biological agents, having built a successful partnership with the Centers for Disease Control and Prevention (CDC) and other Federal agencies in developing secure, robust validated assays for government applications.

- **Other Federal Laboratories:** provide unique government facilities for working with biological agents. The U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) provides interim housing for the National Biodefense Analysis and Countermeasures Center (NBACC); the U.S. Department of Agriculture and Food and Drug Administration laboratories for characterizing the stability of biological agents in various food matrices; the Edgewood Chemical and Biological Center for independent testing of detection systems; the Environmental Protection Agency and the CDC for the collection and analysis of BioWatch samples respectively.

- **Private Sector:** provides operational support for NBACC, BioWatch and Plum Island Animal Disease Center; provides unique facilities and capabilities for supporting NBACC; provides the technology and transition to the marketplace for next generation detection technologies to help meet needs for such systems as a fully autonomous 3rd Generation BioWatch Detection system, rapid detection systems that can act like 'bio smoke alarms' for critical facilities, detection systems for monitoring central food processing facilities, novel detection systems for better characterizing forensic samples and for charactering unknown or emerging agents; and the development of novel assays to support these new detection platforms.

- **Academic:** draws on the expertise of the university Centers of Excellence to provide the longer term R&D needed to respond to an evolving threat and to train the next generation of homeland security scientists. These include:

    - Fundamental insights into the nature of terrorism (Study of Terrorism and Responses to Terrorism, University of Maryland);
    - Research on the environmental risks posed by various biological agents (Center for Advancing Microbial Risk Assessment, Michigan State University);
    - Evaluation of current risk assessment tools and the development of next generation tools (Center for Risk and Economic Analysis of Terrorism Events, University of Southern California);
    - Research into potential threats to animal agriculture (National Center for Foreign Animal and Zoonotic Disease Defense, Texas A&M University); and
    - Post-harvest food security (National Center for Food Protection and Defense, University of Minnesota)

Given the rapid pace of advancement in biotechnology and its attendant implications for evolution in both the available countermeasures and in the future, a variety of mechanisms are used to stay informed of future developments including: formal technology watches and assessments; sponsoring of scientific conferences and National Academy Studies; participation in the program reviews and planning process of other agencies; pre-BAA workshops for ideas and tools to address specific needs; annual DHS S&T conferences to make known our strategies and to meet with developers in special breakout sessions; and frequent contact with developers throughout the year to learn of their capabilities, products, and ideas.

Making the Nation Safer

S&T has also made great strides in addressing many of the recommendations from the post-9/11 study by the National Academies of Science entitled Making the Nation Safer. Examples from our biological defense activities include:

- Creating networks for detection and surveillance — we have pioneered the Nation's first biological monitoring system, BioWatch, operating in more than 30 urban areas to detect biological threat agents and are working with our interagency partners to developing a nationally coordinated approach to biodetection, including mutually agreed upon bio-detection assays and notification protocols.
- Develop and coordinate bioterrorism forensics capabilities — we established the National Bio-Forensics Analysis Center (NBFAC), as the Nation's only dedicated secure operational bioforensics laboratory. This capability, operated in partnership with the FBI, did not exist prior to the events of 2001 and has been designated in the President's *Biodefense for the 21st Century* as the lead federal facility for the technical analysis of bio-crime and bio-terror related samples in a secure environment.
- Developing methods and standards for decontamination: DHS has partnered with the San Francisco International Airport, EPA, CDC, local, regional and state agencies to develop and demonstrate improved protocols and sampling techniques for restoring airports and other transportation hubs following a biological event; sponsored an NAS study on "Reopening Public Facilities After a Biological Attack"; currently co-chairs, along with the EPA, the Subcommittee on Decontamination Standards and Technology under the aegis of the National Science and Technology Committee; and is leading an interagency effort to develop improved sampling strategies and methodologies.
- Create special research organizations to address both classified and unclassified issues related to countermeasures to bioterrorism: the DHS National Biodefense Analysis and Countermeasures Center is dedicated to just such a capability, providing a dedicated, secure environment to conduct laboratory experiments to close key gaps in our understanding of those aspects of the biological threat that

bear on the effectiveness of our countermeasures and to conduct the analytical risk assessments required under the President's *Biodefense for the 21st Century*, to help prioritize these threats and inform the allocation of national resources.

- Establish laboratory standards: DHS plays a significant role in the Integrated Consortium of Laboratory Networks (ICLN) which is developing a system of Laboratory Response Networks, including the associated standards and protocols, to collectively address the full range of chemical, biological, radiological and nuclear threats.

Conclusion

I thank the Subcommittee for this opportunity to present my plan and vision for the Science & Technology Directorate, and to provide insights into the Directorate's process of prioritizing R&D investments that will strengthen our nation's ability to detect, protect against, respond to, and recover from acts of terror as well as acts of nature. In the weeks and months ahead, we will be finalizing and implementing our plans to create a more responsive, customer-focused and robust science and technology management organization that I am confident will prove to be a vital national asset. I will be happy to address any questions you may have.